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Reply to Office Action of August 25, 2005

WHAT I CLAIM IS:

1. (Currently amended) A wedge loading mechanism for a planetary traction drive comprising:

a roller positioned between and in frictional contact with two raceways that form a convergent wedge such as to communicate motion between the two raceways;

wherein the roller includes a flexible mounting having a preselected stiffness ratio K_S/K_R;

wherein the wedge loading mechanism can be operated under any small wedge angle δ while the traction drive operates at or close to ~~the~~ a maximum available friction coefficient μ as characterized by:

$$\frac{K_S}{K_R}=2\left(\mu_0\cos\frac{\delta}{2}-\sin\frac{\delta}{2}\right)\sin\frac{\delta*}{2}\le\mu\sin\delta-2\sin^2\left(\frac{\delta}{2}\right)$$

2. (Previously presented) The wedge loading mechanism of Claim 1, the roller comprising a loading roller ring and wherein the flexible mounting comprises a supporting shaft, an elastic insert, and a bearing.

3. (Previously presented) The wedge loading mechanism of Claim 2 where, as the loading roller ring is driven by friction forces F at contact points A and B into a converged wedge between the two raceways, a normal contact force N and a supporting force F_0 are characterized by:

$$F_0=K_S\cdot l$$

$$N = K_R \cdot l \sin\frac{\delta^*}{2} = K_R \int_0^l \sin\frac{\delta}{2} dl$$

where l is the distance that the center of loading roller ring moves within the converged wedge in response to the friction forces at contact points A and B, and δ is the wedge angle between the two raceways measured at the contact points.

4. (Currently amended) The wedge loading mechanism of Claim 3 where an operating friction coefficient at a contact is μ_0 and [[a]]<u>the</u> supporting force under static equilibrium conditions is characterized by:

$$\frac{F_0}{2N} = \mu_o \cdot \cos\frac{\delta}{2} - \sin\frac{\delta}{2}$$

5. (Original) The wedge loading mechanism of Claim 4 wherein under static equilibrium conditions an effective stiffness ratio between K_S and K_R as characterized by:

$$\frac{K_S}{K_R} = 2\left(\mu_0 \cos\frac{\delta}{2} - \sin\frac{\delta}{2}\right)\sin\frac{\delta^*}{2} \le \mu \sin\delta - 2\sin^2\left(\frac{\delta}{2}\right)$$

where μ is the maximum available friction coefficient at the contacts.

6. (Previously presented) The wedge loading mechanism of Claim 5 where in the situation where the stiffness ratio has a negative value, there is a direction change in the force F_0 indicating the loading roller ring being pushed_into the converged wedge.

7. (Cancelled)

8. (Previously presented) A wedge loading mechanism for a planetary traction drive comprising:

a planetary roller positioned between and in frictional contact with an outer ring member and a sun roller member of the planetary traction drive such as to communicate rotational motion between the outer ring member and the sun roller member, wherein the planetary roller includes a means for flexibly mounting the planetary roller onto a fixed support shaft such that said means biases a center of the planetary roller towards a center of the support shaft, thereby pushing and pulling the planetary roller into and out of a convergent wedge so that the wedge loading mechanism can be operated under any small wedge angle δ while the traction drive operates at or close to ~~the~~ a maximum available friction coefficient μ.

9. (Currently amended) The wedge loading mechanism of Claim 8 wherein said means for flexibly mounting the planetary roller onto the fixed [[a]] support shaft comprises an elastic insert and a bearing, wherein the supporting shaft is located within the elastic insert and the elastic insert is located within the bearing.

10. (Previously presented) A method of transmitting rotational motion and torque within a traction drive device comprising the steps of:

providing a flexibly mounted wedge loading mechanism having a predetermined stiffness ratio K_S/K_R that is a function of a wedge angle δ for different operating friction coefficients μ_0, characterized by:

$$\frac{K_S}{K_R} = 2\left(\mu_0 \cos\frac{\delta}{2} - \sin\frac{\delta}{2}\right)\sin\frac{\delta *}{2} \le \mu \sin\delta - 2\sin^2\left(\frac{\delta}{2}\right);$$

installing the wedge loading mechanism into the traction device, the traction drive having a sun roller member within an outer ring member such that the sun roller member is eccentric to the outer ring member and a circumferential wedge gap is formed between the sun roller member and the outer ring member and the wedge loading mechanism is located within the wedge gap;

installing a planetary roller member into the wedge gap such that the planetary roller member is between and in contact with the sun roller member and the outer ring member; and

wedging the wedge loading mechanism between the outer ring member and the sun roller member by rotation of at least one of either the sun roller member or the outer ring member such that rotation and torque is transmitted from the outer ring member and the sun roller member.

11. (Currently amended) A wedge loading mechanism for a planetary traction drive comprising:

a roller positioned between and in frictional contact with two raceways that form a convergent wedge such as to communicate motion between the two raceways, wherein the roller includes a flexible mounting with a predetermined travel range that limits the

operating friction coefficient μ_0 at or close to a maximum available friction coefficient μ;[[.]]

<u>wherein the flexible mounting has a preselected stiffness ratio *K_S/K_R*</u> characterized by:

$$\frac{K_S}{K_R} = 2\left(\mu_0 \cos\frac{\delta}{2} - \sin\frac{\delta}{2}\right)\sin\frac{\delta^*}{2} \leq \mu \sin\delta - 2\sin^2\left(\frac{\delta}{2}\right)$$

12. (Canceled)

13. (Currently amended) A wedge loading mechanism for a planetary traction drive comprising:

a roller positioned between and in frictional contact with two raceways that form a convergent wedge such as to communicate motion between the two raceways, wherein the roller includes a flexible mounting capable of pushing and pulling the roller into and out of the convergent wedge so that the wedge loading mechanism can be operated under any small wedge angle δ while the traction drive operates at or close to ~~the~~ <u>a</u> maximum available friction coefficient μ.

14. (Previously presented) The wedge loading mechanism of claim 13, the flexible mounting has a preselected stiffness ratio K_S/K_R characterized by:

$$\frac{K_S}{K_R} = 2\left(\mu_0 \cos\frac{\delta}{2} - \sin\frac{\delta}{2}\right)\sin\frac{\delta^*}{2} \leq \mu \sin\delta - 2\sin^2\left(\frac{\delta}{2}\right)$$

15. (Currently amended) The wedge loading mechanism of claim 13, wherein ~~the roller includes a~~ the flexible mounting includes ~~with~~ a predetermined travel range that limits ~~the~~ an operating friction coefficient μ_0 at or close to [[a]] the maximum available friction coefficient μ.

16. (Currently amended) A wedge loading mechanism for a planetary traction drive comprising:

a roller positioned between and in frictional contact with two raceways that form a convergent wedge to communicate motion between the two raceways, wherein the roller includes a flexible mounting that biases a center of the roller to a center of a fixed support shaft, thereby pushing and pulling the roller into and out of the convergent wedge so that the wedge loading mechanism can be operated under any small wedge angle δ while the traction drive operates at or close to ~~the~~ a maximum available friction coefficient μ.

17. (Previously presented) The wedge loading mechanism of claim 16, the flexible mounting has a preselected stiffness ratio K_S/K_R characterized by:

$$\frac{K_S}{K_R} = 2\left(\mu_0 \cos\frac{\delta}{2} - \sin\frac{\delta}{2}\right)\sin\frac{\delta^*}{2} \leq \mu \sin\delta - 2\sin^2\left(\frac{\delta}{2}\right)$$

18. (Currently amended) The wedge loading mechanism of claim 16, wherein ~~the roller includes a~~ the flexible mounting includes ~~with~~ a predetermined travel range

that limits ~~the~~ an operating friction coefficient μ_0 at or close to [[a]] the maximum available friction coefficient μ.

19. (Previously presented) A method of transmitting rotational motion and torque within a traction drive device having an outer ring and a sun roller eccentric to the outer ring thereby defining a circumferential wedge gap, the method comprising the steps of:

providing a flexibly mounted wedge loading mechanism having a preselected stiffness ratio wherein the wedge loading mechanism can be operated under any small wedge angle δ while the traction drive operates at or close to ~~the~~ a maximum available friction coefficient μ as characterized by:

$$\frac{K_S}{K_R} = 2\left(\mu_0 \cos\frac{\delta}{2} - \sin\frac{\delta}{2}\right)\sin\frac{\delta^*}{2} \le \mu \sin\delta - 2\sin^2\left(\frac{\delta}{2}\right); \text{ and}$$

installing wedge loading mechanism into the wedge gap such that the wedge loading mechanism is positioned between and in frictional contact with the outer ring and the sun roller such as to communicate rotational motion between the outer ring and the sun roller.

20. (New) The wedge loading mechanism of claim 8, wherein the means for flexibly mounting biases the center of the roller to the center of the fixed support shaft with tangential friction forces F at contact points between the roller and the two

raceways balanced by normal contact forces *N* at the contact points and a supporting force F_0 at the supporting shaft.

21. (New) The wedge loading mechanism of claim 16, wherein the flexible mounting biases the center of the roller to the center of the fixed support shaft with tangential friction forces *F* at contact points between the roller and the two raceways balanced by normal contact forces *N* at the contact points and a supporting force F_0 at the supporting shaft.